REMARKS

Claims 1-42 remain in the application. Various of the claims are hereby amended. No new matter is being added.

Specification

The specification was objected to for various informalities. Applicants have hereby amended the specification accordingly so as to overcome these objections.

Claim Objections

Claims 1, 2, 4, 5, 9, 10, 18, 19, 21, 23, 25, 27, 28, 32, 33, 34, and 37 were objected to for various informalities. Applicants have hereby amended these claims accordingly so as to overcome these objections.

Claim Rejections--35 USC 102

Claims 1-42 were rejected under 35 USC 102 as being anticipated by Yamaguchi. Applicants respectfully traverse this rejection with respect to the claims as now amended.

Independent claims 1-4 and dependents

Amended claim 4 now recites as follows.

4. A method of processing all or a portion of a multi-dimensional signal with a domain composed of a collection of arbitrarily shaped domains via a multi-scale transform comprising the steps of:

a. Obtaining a multi-dimensional digital image frame;

b. Breaking the image frame into constituent arbitrary shaped domains, or given such a set, that cover all or a portion of the original multi-dimensional signal domain;

c. Performing the domain adaptive transform, **wherein the domain adaptive transform is a transform in which rules of representation are applied to process pixels near a boundary of the domain which differ from the rules of representation applied to process pixels in an interior of the domain**;

d. Quantizing the resultant decomposition coefficients; and

e. Encoding and transmitting the quantized values over an information channel to a decoder for reconstruction of an approximated signal.

(Emphasis added.)

As shown above, amended claim 4 is now limited such that it requires "Performing the domain adaptive transform, **wherein the domain adaptive transform is a transform in which rules of representation are applied to process pixels near a boundary of the domain which differ from the rules of representation applied to process pixels in an interior of the domain**". (Emphasis added.)

This limitation is discussed, for example, in the paragraph starting at the bottom of page 24 in the specification and FIGS. 15A, 15B and 15C, which are reproduced below for convenience of reference.

> **A domain adaptive transform is a transform (multi-scale or otherwise), which changes its rules of representation when it encounters the boundary of an arbitrarily shaped region. These rules will differ from those**

applied by the transform when processing a pixel located in the interior of the image segment, where interior means that the support of an applied filter is wholly contained within the segment domain. Fig. 15A shows a point denoted by 1502 that is located near the segment boundary but still inside the segment called 1500. Fig. 15A also shows another point 1598 that is located in the interior for a given filter of size five along a side. In Fig. 15B the points labeled 1502-1528 are all inside of the intersection of segment 1500 and a filter of support 5x5 placed with its center on pixel 1502. In Fig. 1513 the points labeled 1550-1562 are all inside of the intersection of the complement of segment 1500 (i.e. the set of all points not in segment 1500) and a filter of support 5x5 placed with its center on pixel 1502. In Fig. 15C all points shaded dark gray are located near the boundary of segment 1500 and all points shaded light gray are located in the interior.

(Emphasis added.)

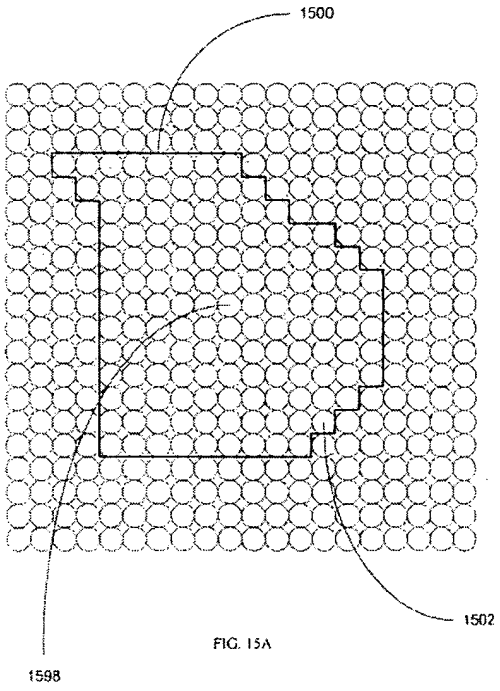


FIG. 15A

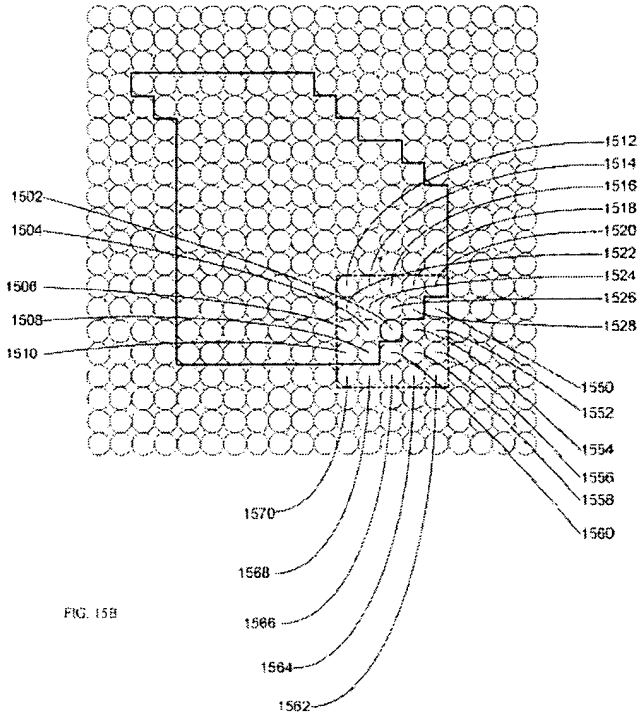


FIG. 15B

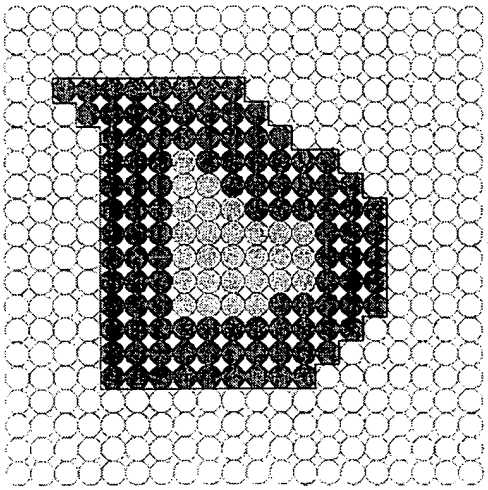


FIG. 15C

Applicants respectfully submit that the above-discussed claim limitation of "Performing the domain adaptive transform, **wherein the domain adaptive transform is a transform in which rules of representation are applied to process pixels near a boundary of the domain which differ from the rules of representation applied to process pixels in an interior of the domain**" (emphasis added) is not taught by the Yamaguchi reference.

Regarding such a "domain adaptive" transform, the office action cites to the DCT 17 and the coding means 10 in Fig. 2 of Yamaguchi, which is reproduced below for convenience of reference.

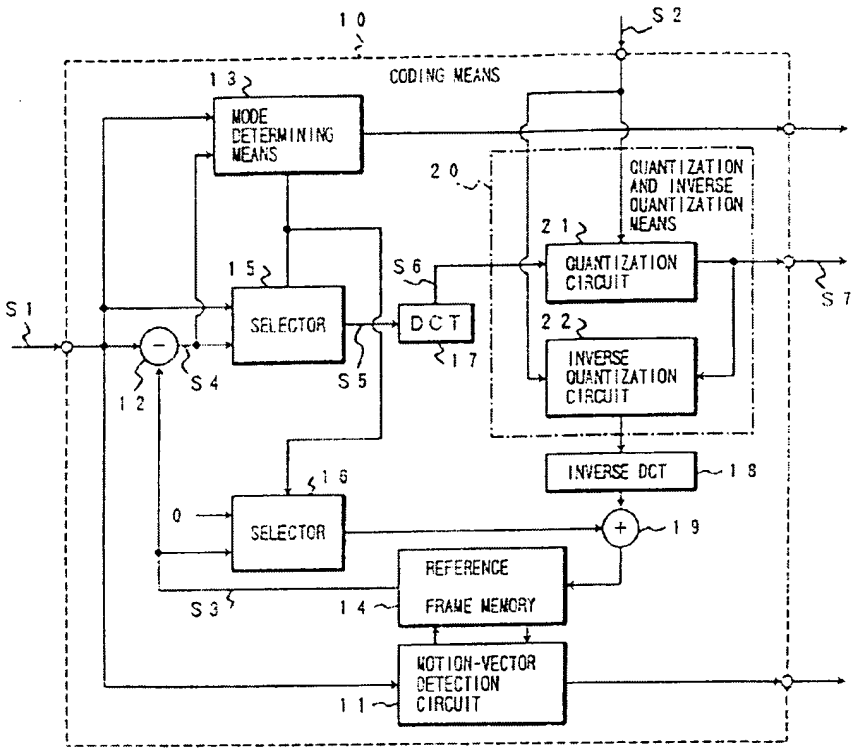


FIG. 2

Applicants respectfully submit that the above figure of Yamaguchi does not teach the claim limitation of "Performing the domain adaptive transform, **wherein the domain adaptive transform is a transform in which rules of representation are applied to process pixels near a boundary of the domain which differ from the rules of representation applied to process pixels in an interior of the domain**". (Emphasis added.)

Therefore, applicants respectfully submit that claim 4, as now amended, now overcomes this rejection.

Similarly, independent claims 1, 2, and 3 are now also amended so as to recite the limitation "**wherein the domain adaptive transform is a transform in which rules of representation are applied to process pixels near a boundary**

of the domain which differ from the rules of representation applied to process pixels in an interior of the domain". (Emphasis added.) Therefore, applicants respectfully submit that amended claims 1-3 now also overcome this rejection.

Claims 6-10 and 15-40 depend from one or more of independent claims 1-4. Therefore, applicants respectfully submit that claims 6-10 and 15-40 now also overcome this rejection for at least the reasons discussed above in relation to claims 1-4.

Independent claim 5

Independent claim 5 is now amended so as to include the limitation of "Performing a pattern adaptive transform on the signal, **wherein the pattern adaptive transform is a transform that adapts to patterns present in the multi-dimensional signal**". (Emphasis added.)

This limitation is discussed, for example, in the paragraph starting at the bottom of page 30 in the specification and FIGS. 17A, 17B and 17C, which are reproduced below for convenience of reference.

> A pattern adaptive transform is a transform that adapts itself to the patterns inherently present in the data the transform being applied to. In particular, one embodiment of multi-scale pattern adaptive transforms will be described here. As was mentioned earlier, in a multi-scale pyramidal transform, the forward transform build coarser and coarser averages of the image data are produced. On the inverse transform, the coarser parent data are used to predict the data on the finer(child) scale. The data is not interpolated with constant filter coefficients, rather the coefficients are scaled in the data dependent way. The interpolation filter thus adapts itself to the pattern of the data. **Specifically in the current embodiment, a 4x4 set of parents is chosen for interpolating the child grid. Each point initially has a fixed coefficient of a 4x4 filter**

associated with it. The approximate gradient value to each of the 16 parent values from the center is then computed. Each of the filter coefficients is then scaled by the inverse of the gradient value. The new filter is re-normalized and then applied to interpolate the data. **In Fig. 17A, an example of a "diagonal trough". The low lying line of the "trough" going from lower left to upper right are the low points emphasized in gray. In case of the "trough", the gradient values along the trough are small, while in the direction perpendicular to the trough are high. Thus the point in the middle will interpolated primarily along the "equipotential" lines roughly parallel to die "trough", with the weight of the other points being quite small. The "trough" can also have a bend as illustrated by Fig. 17B. Here, the low lying line of the "trough" is again emphasized in gray, but it is no longer straight. The interpolation will still happen along the "equipotential" lines, this time approximately following the curve of the "trough". Fig 17C contains a "slanted surface". For the slanted surface, the low lying line of the trough is again emphasized in gray, here going from bottom left to top left.** Again, the interpolation will happen mainly along the constant contour lines (up/down in this case) of the slanted surface. Note that no edge detection needs to be performed.

(Emphasis added.)

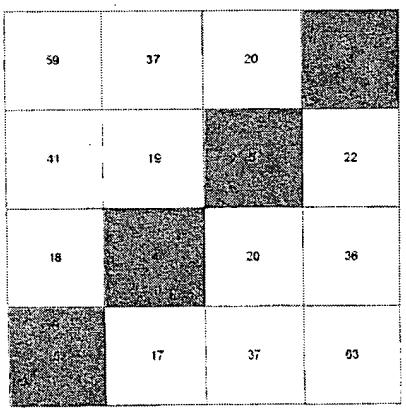


FIG. 17A

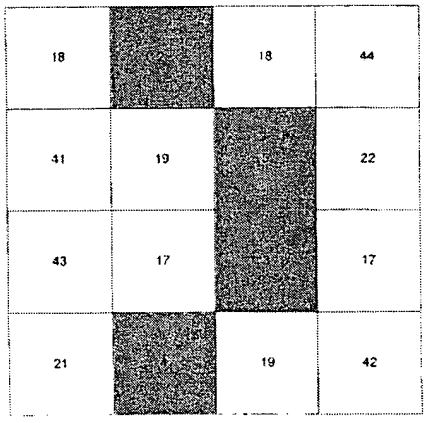


FIG. 17B

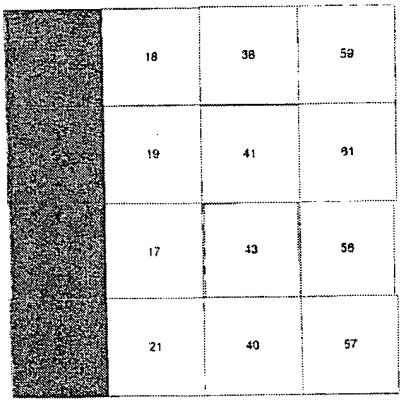


FIG. 17C

Applicants respectfully submit that the above-discussed claim limitation of "Performing a pattern adaptive transform on the signal, **wherein the pattern adaptive transform is a transform that adapts to patterns present in the**

multi-dimensional signal" (emphasis added) is not taught by the Yamaguchi reference.

Regarding such a "pattern adaptive" transform, the office action cites to the signal "S2" and "S1" in Fig. 2 of Yamaguchi, which is again reproduced below for convenience of reference.

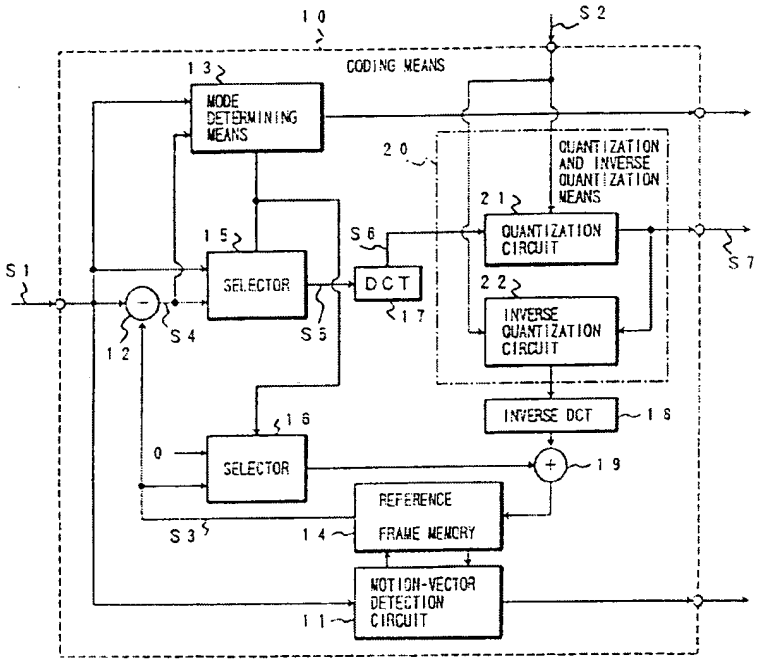


FIG. 2

Applicants respectfully submit that the above figure of Yamaguchi does not teach the claim limitation of "Performing a pattern adaptive transform on the signal, **wherein the pattern adaptive transform is a transform that adapts to patterns present in the multi-dimensional signal**". (Emphasis added.)

Therefore, applicants respectfully submit that claim 5, as now amended, now overcomes this rejection.

Claims dependent on either claim 1 or 5

Claims 11-14 depend on either claim 1 (relating to domain adaptive transforms) or claim 5 (relating to pattern adaptive transforms). Applicants respectfully submit that these claims also overcome this rejection for at least the same reasons discussed above in relation to claims 1 and 5.

Conclusion

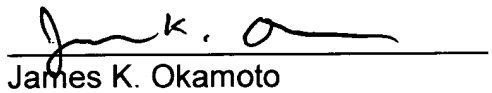
For the above discussed reasons, applicants respectfully submit that claims 1-42, as now amended, now overcome the objections and rejections in the office action.

The Examiner is invited to call the undersigned for any questions. Favorable action is respectfully solicited.

Respectfully submitted,

Adityo Prakash, et al.

Dated: March 23, 2007

By: 

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Enclosure(s)

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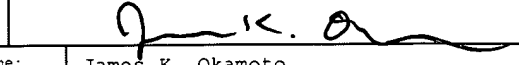
Signature:			
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